look on while our million and a half is squandered by directors who now confessedly are to be men without business knowledge of the industry they control."

If we would take advantage of the great opportunity which this war affords for industrial and economic rearrangements, it is imperative that the ruling classes in this country should no longer continue in their present state of semi-education which passes as culture, and which permits them to go through life with little or no understanding of the vital importance of science to the State. If after the war we are to recover some of the chemical industries which we have lost, and even maintain those which we still possess, it is essential that the individual undertakings should be controlled by men who have a real and expert knowledge of the business in which they are engaged, and that our legislators should have had sufficient scientific education to enable them to understand such problems connected with these industries as may be brought before them. The experience of the past thirty years points unmistakably to the conclusion that industrial success is becoming more and more dependent upon the co-ordination of industrial effort, and the embarrassing position in which we find ourselves at the present moment, in respect of the supply of a number of chemical products, is largely attributable to the almost entire absence of any such organisation. In both France and Germany we understand that councils of experts have been appointed to inquire into the effects of the war on the chemical industries of these countries, and to report to their respective Governments as to what legislative measures are desirable for promoting their welfare. As the present crisis is on a scale which we trust may never recur in the history of the world, so the opportunity for discarding mischievous traditions, effete ideas, and clumsy methods of procedure is of such an altogether exceptional character that it is to be hoped we shall not allow it to pass unutilised through ignorance, lethargy, or divided counsels.

THE CHEMISTRY OF FOOD PRODUCTS.

Food Products. By Prof. H. C. Sherman. Pp. ix+594. (New York: The Macmillan Co.; London: Macmillan and Co., Ltd., 1914.) Price 10*s*. net.

APART from the analytical side, chemistry in its application to food products is a neglected science in this country in comparison with the activity which exists in America. The neglect, however, has been, in the main, in official and public circles, as several of the British food manufacturers of repute have availed themselves of scientific help for some years past, and it may be claimed that the high—not to say world-wide—repute of the products of some of these firms is to some extent due to the resource of, as well as the control exercised by, their scientific staff. In the United States, legislation has been very largely the cause of the awakening of the public interest in its food, and in this connection the name of Dr. H. W. Wiley will be remembered with gratitude by present and future generations. Whatever the cause, the development of the investigation of the composition and value of food products has been exceptionally rapid during the past few years: it is manifested by such outward signs as the foundation of university chairs in food chemistry in America, and the publication of informative text-books.

As the moment is ripe for reform, the wisdom of founding such a chair at our own Imperial College of Technology may be urged: there is much to be done, for example, in educating the public as to the food value of many low-priced products from our Colonial Empire, which are at present neglected, and in showing manfacturers how to make better use of the available raw material.

Dr. H. C. Sherman, who occupies the chair of food chemistry at Columbia University, has produced an exceptionally informative book, in which he combines an account of the production and preparation of the various food products for the market, with statistical data, details as to their chemistry and physiology, and an outline of the latest scientific research and opinions.

The book also contains a large number of up-to-date tables giving the food values, protein content, and mineral constituents of all sorts of foods, and is, indeed, replete with information of every kind, so that it will be indispensable to every food chemist and manufacturer. All the principal food products are dealt with in turn, each chapter being concluded with a list of references to the literature. Though much of the information given is outside the ordinary scope of the college trained chemist, it corresponds exactly with the practical details which the actual worker requires, and we do not remember to have seen this given so succinctly anywhere else. The more advanced scientific sections are equally satisfactory, so that current views are expressed without undue dogmatism: this is especially the case in the more physiological sections.

A good deal of space is devoted both in an appendix and elsewhere to the rules and regulations for the enforcement of the Foods and Drugs

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Act in America. These are of great interest to the British reader in view of the possibility of more drastic food legislation here, though fortunately the sale of inferior food materials is not tolerated to anything like the extent that existed in America. It is commonly understood that the most drastic legislation was necessary there to combat the existing evils, although its severity has to some extent acted in restriction of trade. In any case, such movement here should be official and under the guidance of responsible scientific opinion, and not sponsored by irresponsible "Pure Food Institutions."

The university courses of study are already so crowded that there is no time for the introduction of food chemistry into the degree course, nor, indeed, is such desirable. The would-be chemist, if he is to play his part in building up British industries, must be trained as a chemist first and as a specialist afterwards. Books such as this will be of the utmost service at the stage when the young chemist has to act on his own and to take responsibility. Prof. Sherman has done a great service to his colleagues. From the point of view here developed it is to be hoped that he will compress rather than enlarge future editions, so that the book may be read and not consulted as a dictionary.

E. F. A.

APPLIED BOTANY.

(1) *A Text-book of Grasses, with Especial Reference to the Economic Species of the United States.* By Prof. A. S. Hitchcock. Pp. xvii+276. (New York: The Macmillan Co.; London: Macmillan and Co., Ltd., 1914.) Price 6*s*. 6*d*. net.

(2) *A Manual of Weeds.* By A. E. Georgia. Pp. xi+593. (New York: The Macmillan Co.; London: Macmillan and Co., Ltd., 1914.) Price 8*s*. 6*d*. net.

(1) ALTHOUGH we are disposed to welcome any innovation in the planning of text-books of applied science, we cannot congratulate the author of the work under review on the scheme which he has adopted. He divides his book into two parts, and treats first of economic agrostology, and subsequently, of systematic agrostology. As a consequence, the student who begins the book at the beginning reads of a considerable number of grasses, mostly called by their popular names, and if he be a novice, he must pause at each page to look up, in the systematic part, what these names signify. Moreover, whether he be novice or adept, he will find but little information of real value in the economic section. He will discover how much corn and wheat and barley and other cereals is grown in the United States, and how much each of these crops is worth; that America eats wheaten bread, and that the inhabitants of the "Old World" subsist on wheat, corn, and rice. Beside some useful general information, he will find a chapter on lawns, and a page or two on sand-binding grasses.

It may be that this somewhat discursive treatment is all that is possible in the present stage of "economic agrostology"; but whether it be so or no, we feel convinced that the proper place for it is at the end and not at the beginning of the volume.

Part ii. opens with an account of the morphology of the vegetative and floral organs of grasses. The descriptions are terse and clear, but their value is reduced very materially by the fact that not one figure is given by way of illustration, neither of the vegetative organs nor of the somewhat difficult inflorescence and flower. This is the more remarkable in that the succeeding taxonomic chapters are well and copiously illustrated.

The experience of the reviewer convinces him that it is impossible to teach the systematic botany of grasses unless the student has first mastered thoroughly the floral morphology of typical forms, and doubt may be expressed whether such mastering may be obtained by merely following the written text.

The taxonomical section, which occupies nearly half the book, follows in part the classification adopted by Bentham and Hooker, and, with respect to the "tribes," that of Hackel. The code governing nomenclature is not that laid down in the Vienna rules, but is "The American Code of Botanical Nomenclature." To criticise this decision scarcely becomes a non-American reviewer, but he may express a regret that systematists cannot come to a general agreement which will prevent these games of nine-pins with names. For example, all the gardens of Europe know Pampas grass by the name *Gynerium argenteum*. In this book it is called *Cortaderia argentea,* and no indication is given whether *Gynerium argenteum* is synonymous with *C. argentea,* or whether the latter is another plant under the same common name. Buffon said long ago that it was easier to learn botany than botanical nomenclature. The systematists seem to take a joy in maintaining the truth of the aphorism.

(2) M. Boutroux has insisted recently that sentiment no less than will and intellect must be reckoned with in the psychological make-up of mankind. No one who has fought with weeds, whether in the farm, the garden, or the golf-green will doubt it. The fight was stubborn and its fortunes varied, but whether won or lost, the

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